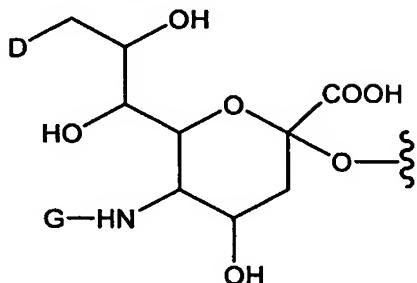


**WHAT IS CLAIMED IS:**

1 1. An erythropoietin peptide comprising the moiety:



2

3       wherein

4       D is a member selected from -OH and R<sup>1</sup>-L-HN-;

5       G is a member selected from R<sup>1</sup>-L- and -C(O)(C<sub>1</sub>-C<sub>6</sub>)alkyl;

6       R<sup>1</sup> is a moiety comprising a member selected a moiety comprising a straight-

7       chain or branched poly(ethylene glycol) residue; and

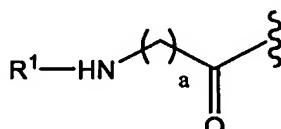
8       L is a linker which is a member selected from a bond, substituted or

9       unsubstituted alkyl and substituted or unsubstituted heteroalkyl,

10      such that when D is OH, G is R<sup>1</sup>-L-, and when G is -C(O)(C<sub>1</sub>-C<sub>6</sub>)alkyl, D is

11      R<sup>1</sup>-L-NH-.

1 2. The peptide according to claim 1, wherein L-R<sup>1</sup> has the formula:



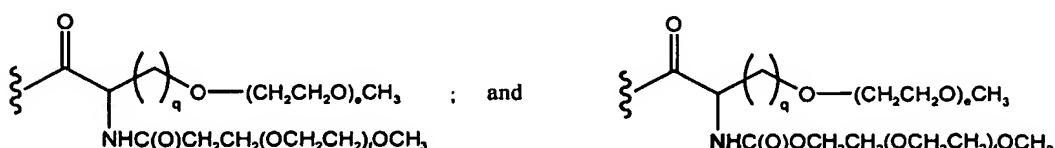
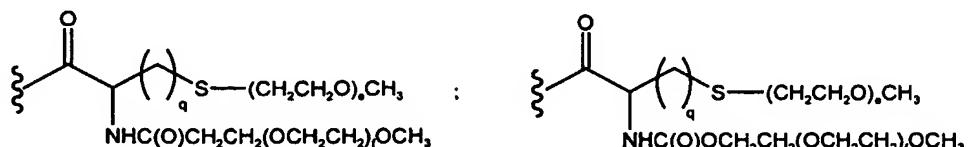
2

3       wherein

4       a is an integer from 0 to 20.

1 3. The peptide according to claim 1, wherein R<sup>1</sup> has a structure that is a member

2       selected from:

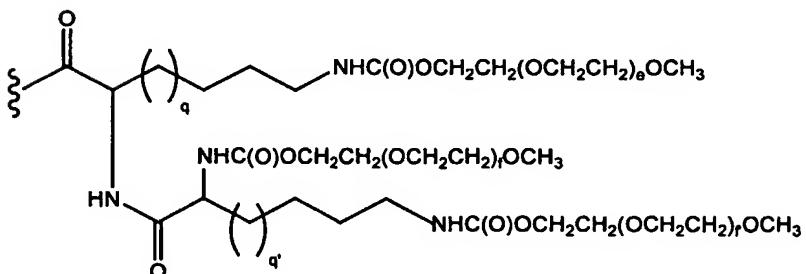
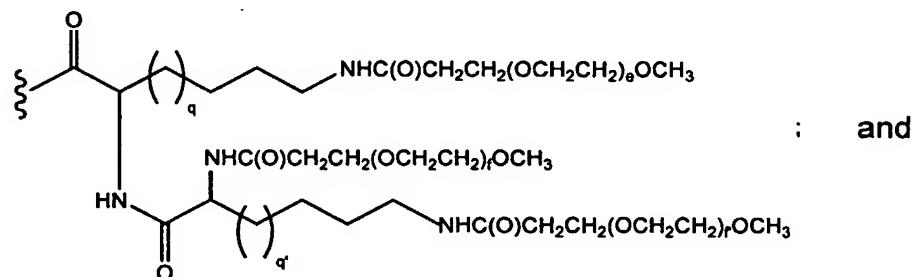
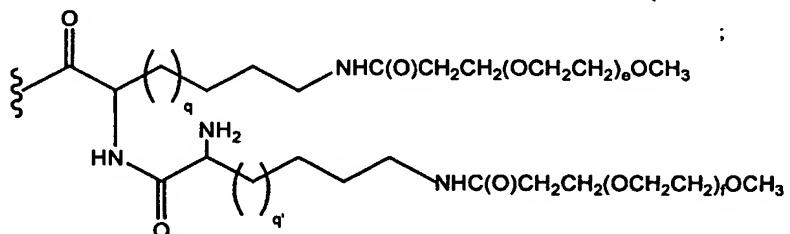
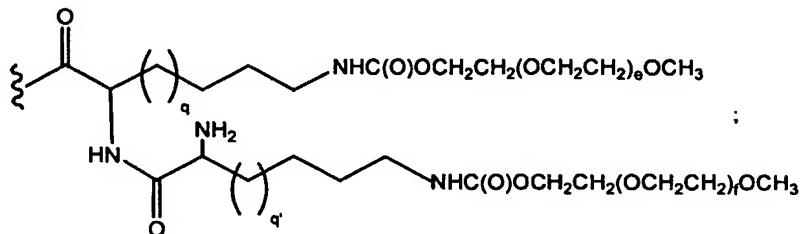


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4       wherein

5           e and f are integers independently selected from 1 to 2500; and  
 6           q is an integer from 0 to 20.

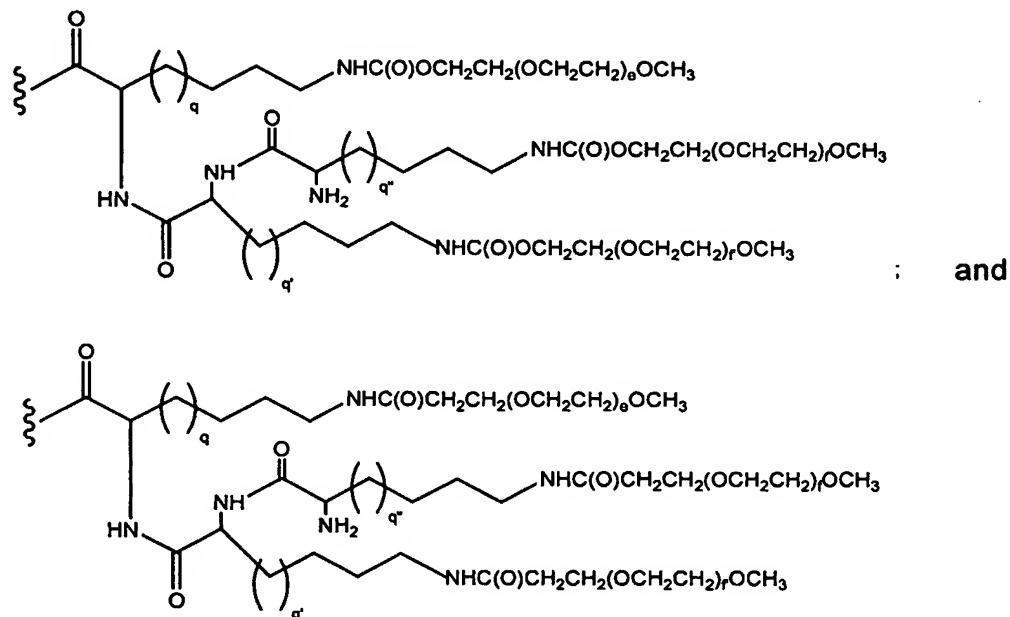
1    4.    The peptide according to claim 1, wherein R<sup>1</sup> has a structure that is a member  
 2    selected from:



3  
 4           wherein

5           e, f and f' are integers independently selected from 1 to 2500; and  
 6           q and q' are integers independently selected from 1 to 20.

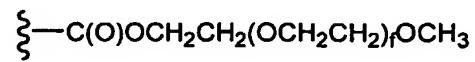
1 5. The peptide according to claim 1, wherein R<sup>1</sup> has a structure that is a member  
 2 selected from:



3  
 4 wherein

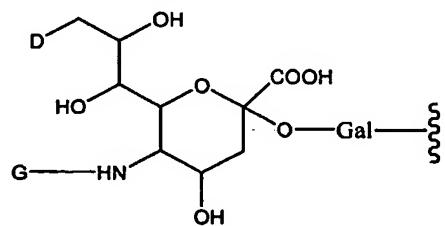
5 e, f and f' are integers independently selected from 1 to 2500; and  
 6 q, q' and q'' are integers independently selected from 1 to 20.

1 6. The peptide according to claim 1 wherein R<sup>1</sup> has a structure that is a member  
 2 selected from:



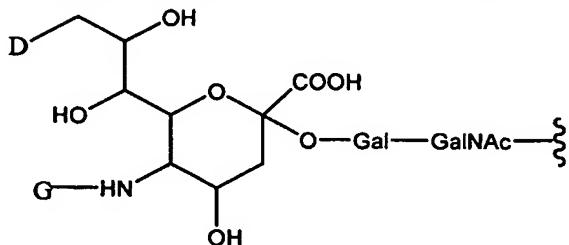
3  
 4 wherein  
 5 e and f are integers independently selected from 1 to 2500.

1 7. The peptide according to claim 1, wherein said moiety has the formula:



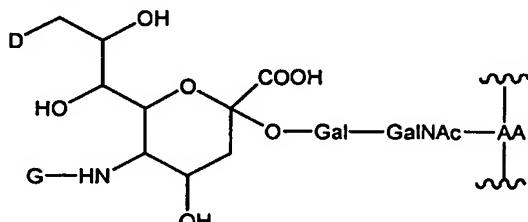
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1    8.    The peptide according to claim 1, wherein said moiety has the formula:



2

1    9.    The peptide according to claim 1, wherein said moiety has the formula:



2

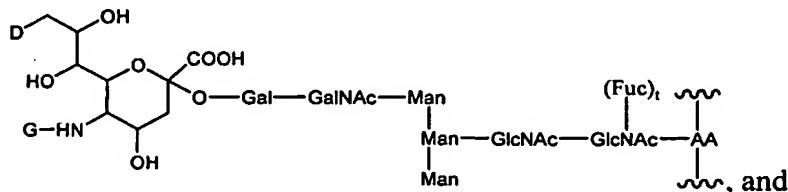
3    wherein AA is an amino acid residue of said peptide.

1    10.    The peptide according to claim 9, wherein said amino acid residue is a  
2    member selected from serine or threonine.

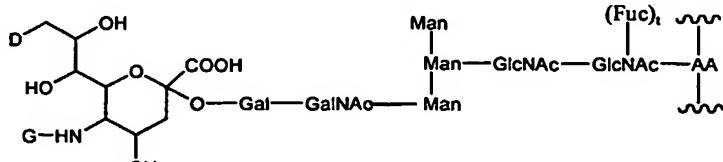
1    11.    The peptide according to claim 10, wherein said peptide has the amino acid  
2    sequence of SEQ. ID. NO:1.

1    12.    The peptide according to claim 11, wherein said amino acid residue is a serine  
2    at position 126 of SEQ. ID. NO:1.

1    13.    The peptide according to claim 1, wherein said peptide comprises at least one  
2    of said moiety according to a formula selected from:



3



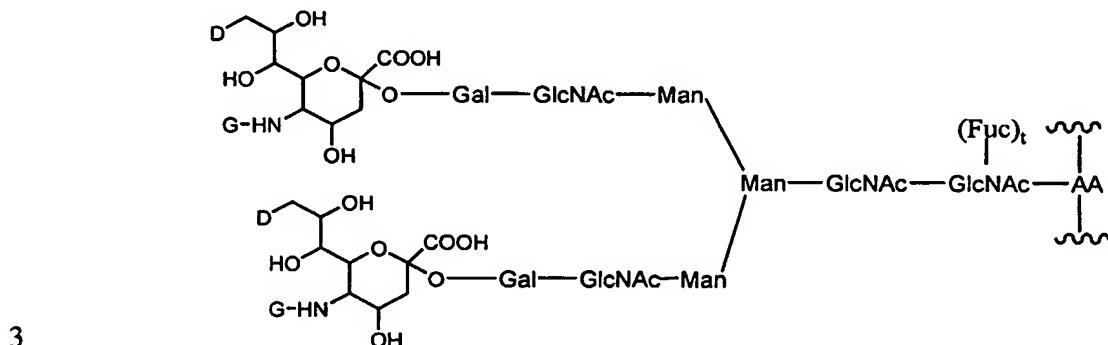
4

5    wherein AA is an amino acid residue of said peptide and t is an integer equal to 0  
6    or 1.

1 14. The peptide according to claim 13, wherein said amino acid residue is an  
 2 asparagine residue.

1 15. The peptide according to claim 14, wherein said peptide has the amino acid  
 2 sequence of SEQ ID NO:1, and wherein said amino acid residue is an asparagine  
 3 residue which is a member selected from N24, N38, N83, and combinations thereof.

1 16. The peptide according to claim 1 wherein said peptide comprises at least one  
 2 of said moiety according to the formula:

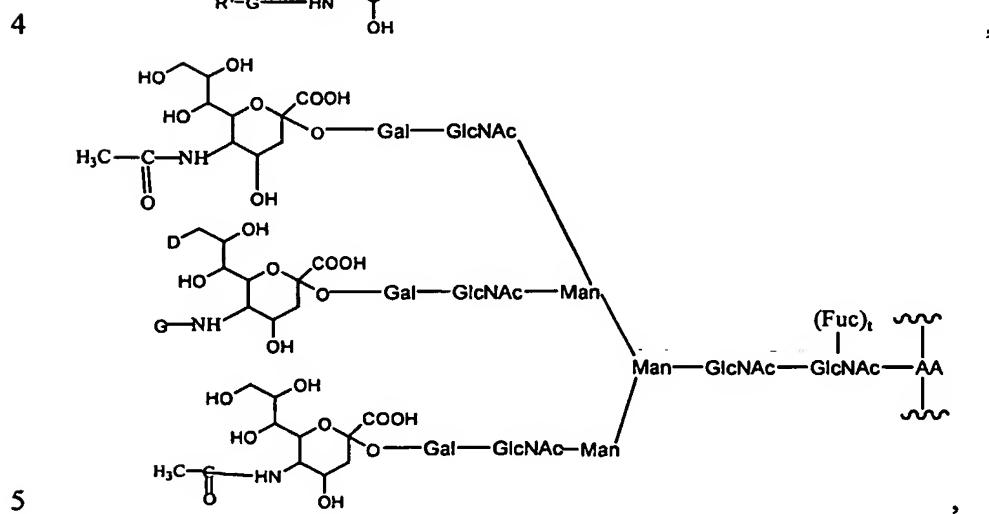
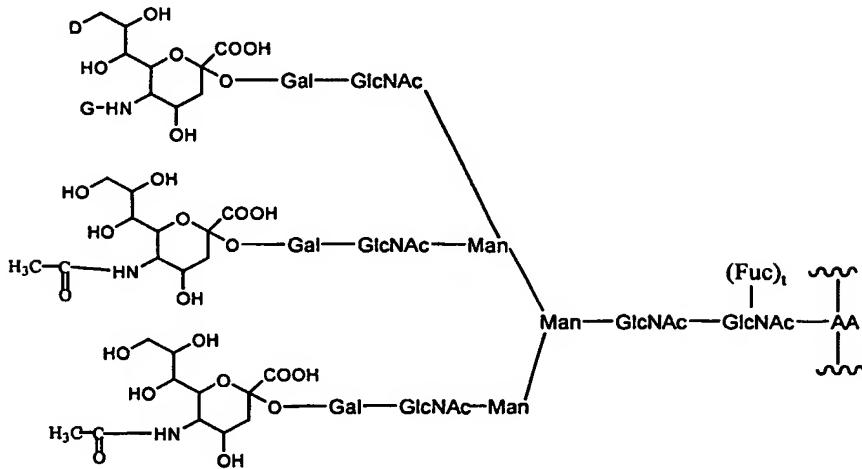


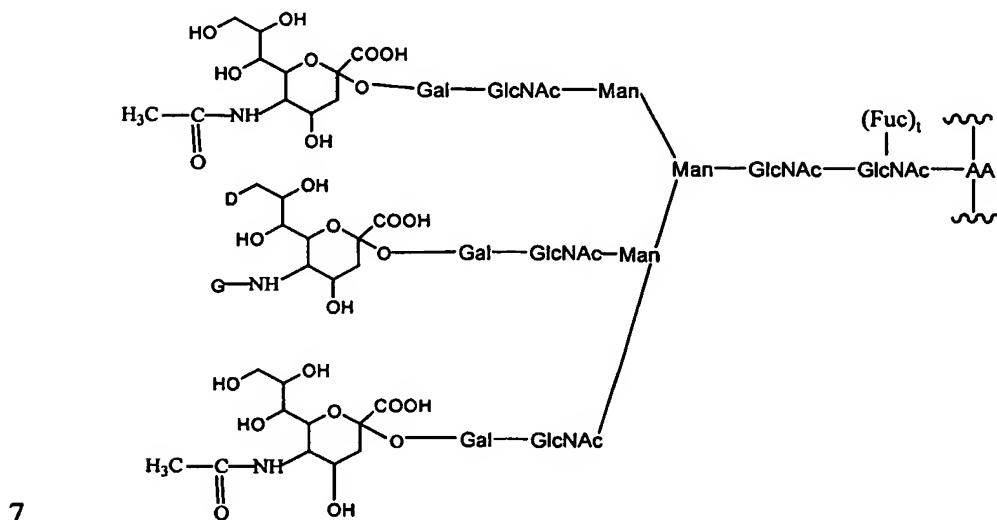
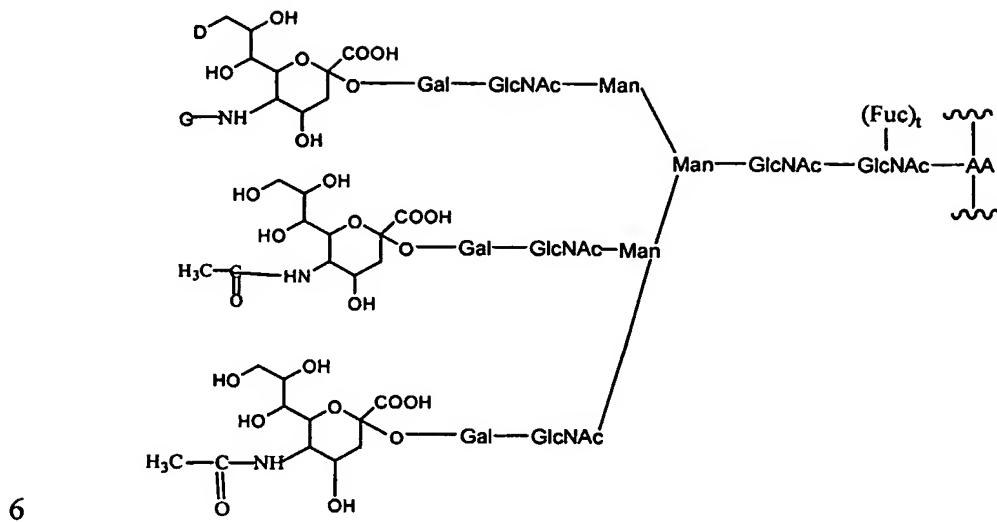
4 wherein AA is an amino acid residue of said peptide, and t is an integer equal to 0 or  
 5 1.

1 17. The peptide according to claim 16, wherein said amino acid residue is an  
 2 arginine residue.

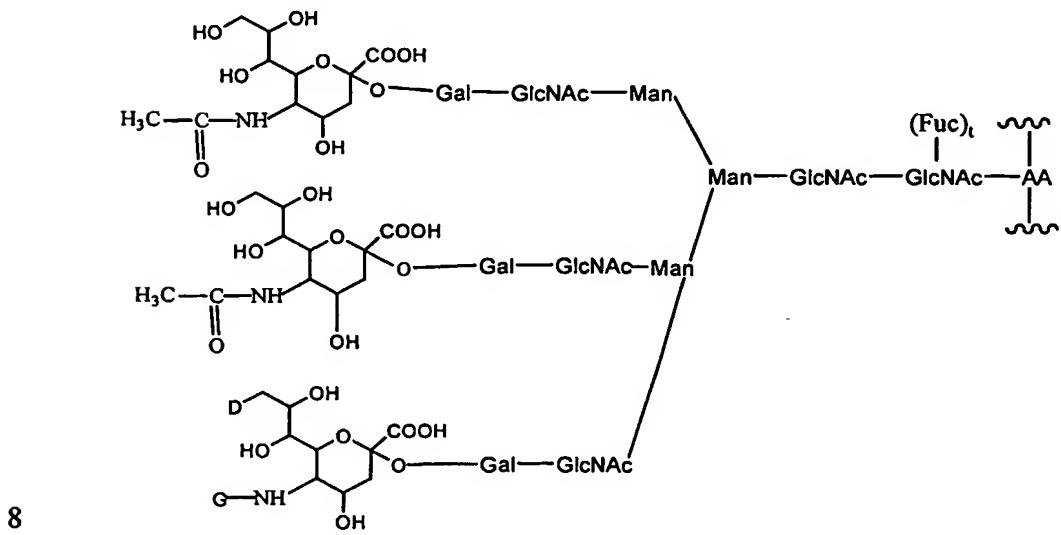
1 18. The peptide according to claim 17, wherein said peptide has the amino acid  
 2 sequence of SEQ ID NO:1, and wherein said amino acid residue is an asparagine  
 3 residue which is a member selected from N24, N38, N83, and combinations thereof.

1 19. The peptide of claim 1, wherein said peptide comprises at least one of said  
 2 moiety according to a formula selected from:



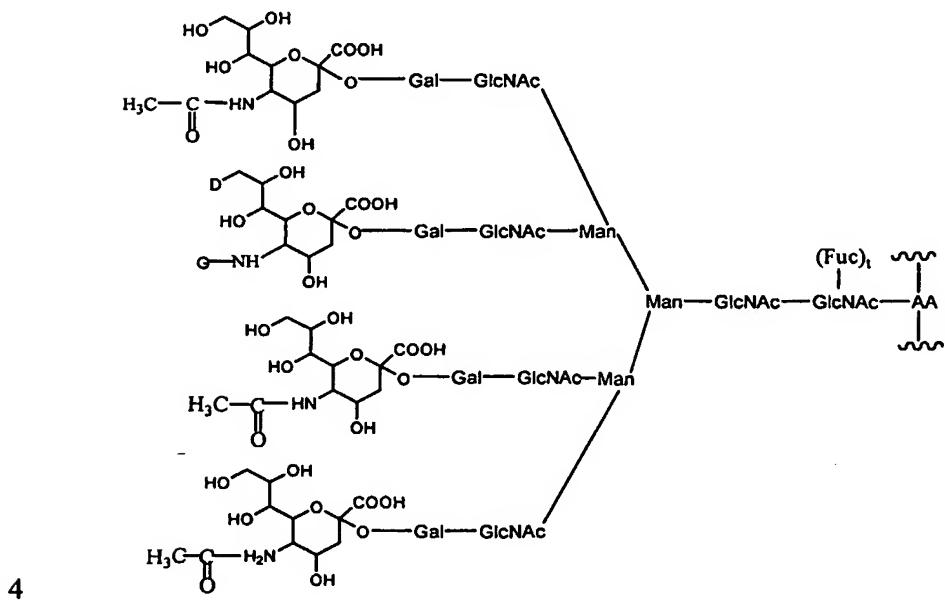
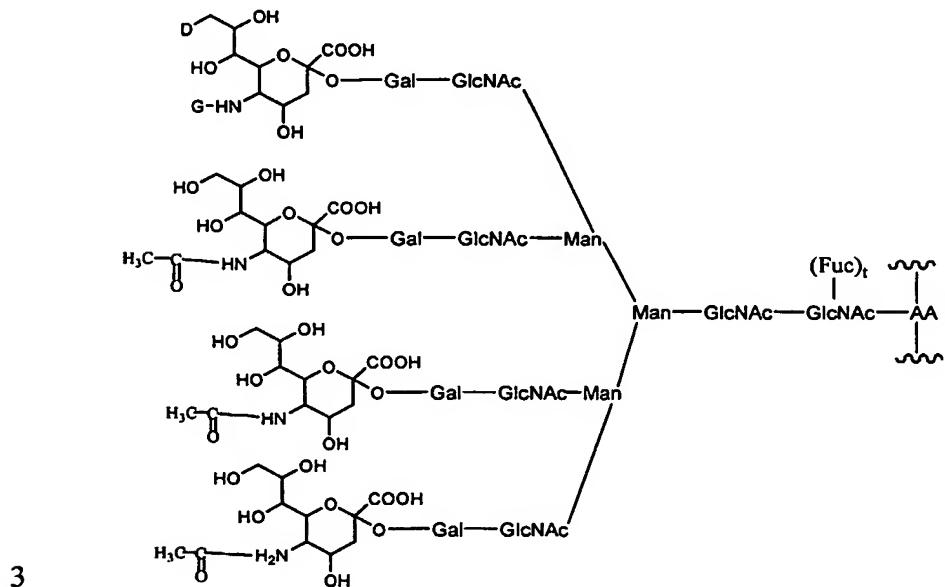


, and

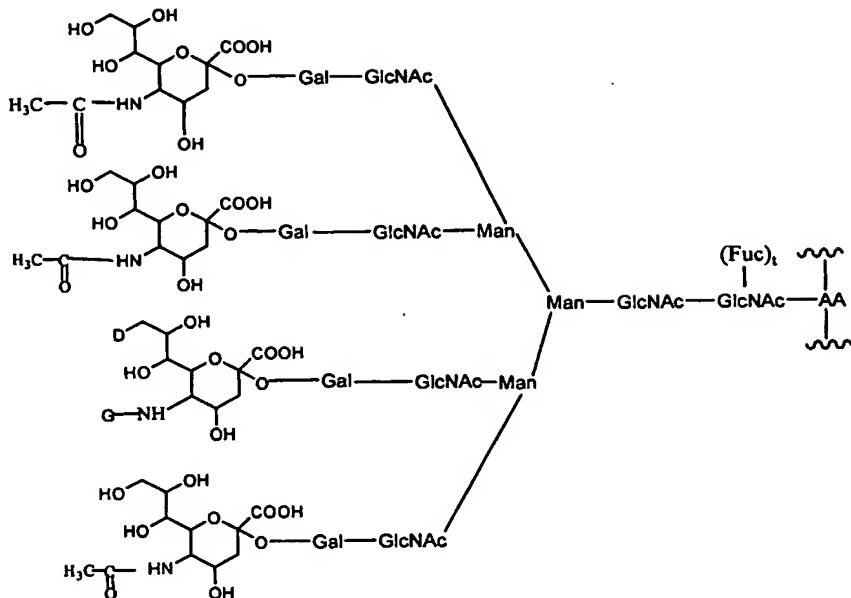


9       wherein AA is an amino acid residue of said peptide, and t is an integer equal to  
 10      0 or 1.

1      **20.**    The peptide according to claim 1 wherein said peptide comprises at least one  
 2      said moiety according to a formula selected from:

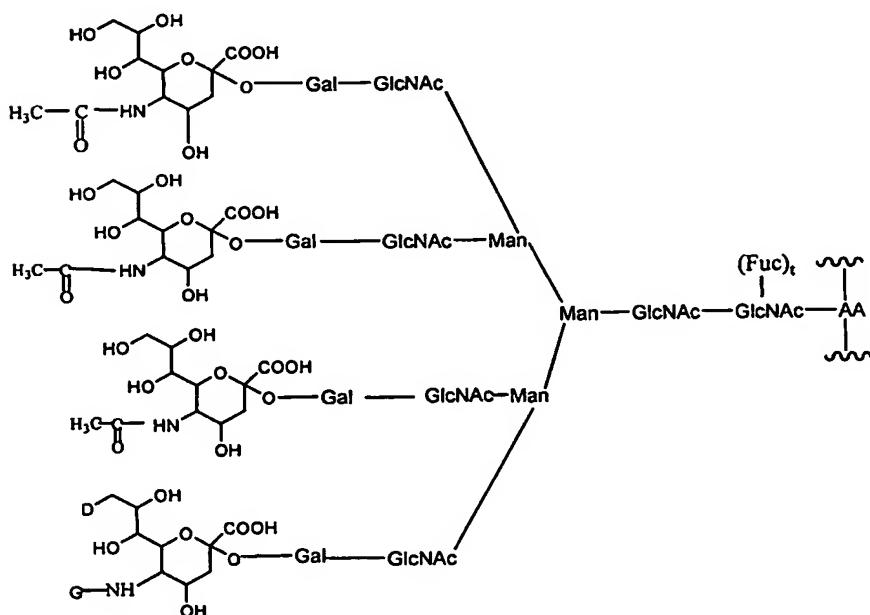


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5

, and



6

7 wherein AA is an amino acid residue of said peptide, and t is an integer equal to 0  
8 or 1.

1 21. The peptide according to claim 20, wherein said amino acid residue is an  
2 asparagine residue.

1 22. The peptide according to claim 21, wherein said peptide has the amino acid  
2 sequence of SEQ ID NO:1, and wherein said amino acid residue is an asparagine  
3 residue which is a member selected from N24, N38, N83, and combinations thereof.

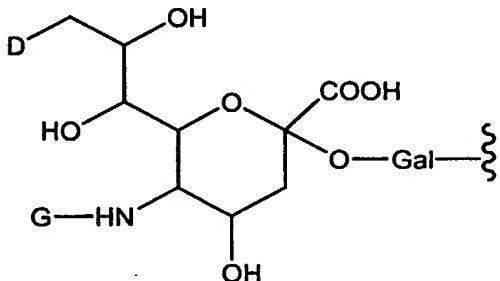
1 23. The peptide according to claim 1, wherein said peptide is a bioactive  
2 erythropoietin peptide.

1 24. The peptide according to claim 23, wherein said peptide is erythropoietically  
2 active.

1 25. The peptide according to claim 24, wherein said peptide is essentially non-  
2 erythropoietically active.

1 26. The peptide according to claim 25, wherein said peptide is tissue protective.

1 27. A method of making a PEG-ylated erythropoietin comprising the moiety:



wherein

$R^1$  is a moiety comprising straight-chain or branched poly(ethylene glycol) residue; and

L is a linker which is a member selected from substituted or unsubstituted alkyl and substituted or unsubstituted heteroalkyl.

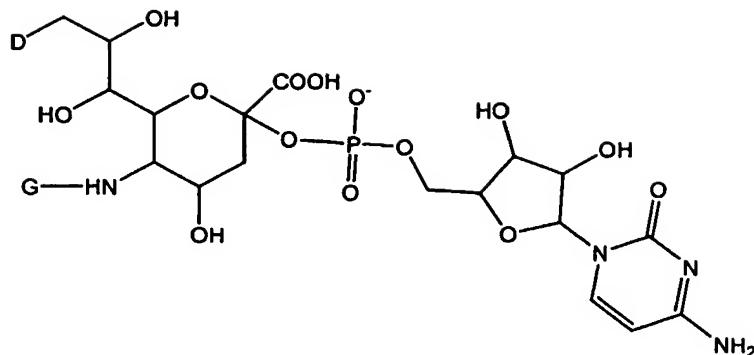
said method comprising:

(a) contacting a substrate erythropoietin peptide comprising the

## 10 glycosyl moiety:



with a PEG-sialic acid donor moiety having the formula:



14

15 and an enzyme that transfers said PEG-sialic acid onto the Gal of said glycosyl  
 16 moiety, under conditions appropriate to for said transfer.

1 28. The method of claim 27, further comprising, prior to step (a):

2 (b) expressing said substrate erythropoietin peptide in a suitable host.

1 29. The method of claim 28, wherein said host is selected from an insect cell and a  
 2 mammalian cell.

1 30. The method of claim 29, wherein said insect cell is a *Spodoptera frugiperda*  
 2 cell line.

1 31. A method of treating a condition in a subject in need thereof, said condition  
 2 characterized by compromised red blood cell production in said subject, said method  
 3 comprising the step of administering to the subject an amount of a peptide according  
 4 to claim 1, effective to ameliorate said condition in said subject.

1 32. A method of enhancing red blood cell production in a mammal, said method  
 2 comprising administering to said mammal an peptide according to claim 1.

1 33. A method of treating a tissue injury in a subject in need thereof, said injury  
 2 characterized by damage resulting from ischemia, trauma, inflammation or contact  
 3 with toxic substances, said method comprising the step of administering to the subject  
 4 an amount of an erythropoietin peptide according to claim 1, effective to ameliorate  
 5 the damage associated with the tissue injury in said subject.

1 34. A pharmaceutical formulation comprising the erythropoietin peptide according  
 2 to claim 1, and a pharmaceutically acceptable carrier.